

February 13, 2008 Conference call with Ken Tichy Project Manager for ABT.

Location - Garry Christensen's office phone

Attendees - Jerry Hintze, Garry Christensen IPSC, Ken Tichy ABT

Ken Tichy was contacted by phone under the request of Jerry Hintze. The timetable of the injectors was discussed. Ken stated that the casting and coating of the tips is really the controlling item. Throwing more manpower on the tip work will not shorten the time. Ken did state that all the elbows should be shipped by the end of February. Jerry Hintze asked Ken if they were working 24/7 on the injectors and if not, could they. Jerry also discussed with Ken a possible option which would involve IPSC paying for extra labor to insure their arrival in time. Ken said he did not think this was an option and would look further into this option. Ken said that all the tips should be cast by the end of February and at that time he would have a better idea as to completion times.

IP7020967

From: "Allen, Robert J O642" <robertj.allen@siemens.com>
To: "Jerry Hintze" <JERRY-H@ipsc.com>
Date: 1/14/2008 11:46 AM
Subject: FW: Intermountain Replacement Burners
Attachments: TO BTS 12-17-07.doc; 07008-100-A97-0 R01.pdf; ST-8866B.tif

FYI

Subject: RE: Intermountain Replacement Burners

1. Attached are Installation Drawings for Transmittal to Customer.

Please let me know if you have any questions, comments or concerns.

Best Regards,

Kenneth V. Tichy, P.E.

Project Manager

Advanced Burner Technologies

A SIEMENS Company

271 Route 202/206

PO Box 410

Pluckemin, NJ 07978

ken.tichy@siemens.com

PHONE: 908.212.0571

FAX: 908.470.0479

CELL: 908.391.2175

IP7020968

From: Tichy, Ken V O6473
Sent: Tuesday, December 11, 2007 9:26 AM
To: Allen, Robert J O642
Subject: RE: Intermountain Replacement Burners

No but Sal asked me to check. Hence my e-mail of 11/16.

Best Regards,

Kenneth V. Tichy, P.E.

Project Manager

Advanced Burner Technologies

A SIEMENS Company

271 Route 202/206

PO Box 410

Pluckemin, NJ 07978

ken.tichy@siemens.com

PHONE: 908.212.0571

FAX: 908.470.0479

CELL: 908.391.2175

From: Allen, Robert J O642
Sent: Tuesday, December 11, 2007 9:23 AM
To: Tichy, Ken V O6473
Subject: RE: Intermountain Replacement Burners

IP7020969

Ken,

Are these thermocouples any different than what is installed in the existing burners?

Bob Allen

From: Tichy, Ken V O6473
Sent: Monday, December 10, 2007 4:58 PM
To: Allen, Robert J O642
Subject: RE: Intermountain Replacement Burners

Bob,

I need to go ahead with the Intermountain Thermocouple order this week to meet delivery. Attached is a supplement to the information sent 11/16. This is what I will go with unless I hear otherwise.

Best Regards,

Kenneth V. Tichy, P.E.

Project Manager

Advanced Burner Technologies

A SIEMENS Company

271 Route 202/206

PO Box 410

Pluckemin, NJ 07978

ken.tichy@siemens.com

PHONE: 908.212.0571

IP7020970

FAX: 908.470.0479

CELL: 908.391.2175

From: Tichy, Ken V O6473
Sent: Friday, November 16, 2007 5:36 PM
To: Allen, Robert J O642
Subject: Intermountain Replacement Burners

Bob,

Can you check with the customer with regard to the thermocouples? In the past we provided a waterproof head that they wire into (sketch attached). Please confirm that this arrangement is best for them.

Thanks

Best Regards,

Kenneth V. Tichy, P.E.

Project Manager

Advanced Burner Technologies

A SIEMENS Company

271 Route 202/206

PO Box 410

Pluckemin, NJ 07978

IP7020971

ken.tichy@siemens.com

PHONE: 908.212.0571

FAX: 908.470.0479

CELL: 908.391.2175

From: "Tichy, Ken V O6473" <ken.tichy@siemens.com>
To: "Garry Christensen" <Garry-C@ipsc.com>
Date: 2/8/2008 8:13 AM
Subject: RE: Burner elbows and injectors for Intermountain Power

Greetings Gary,

I apologize for not getting back to you sooner. I was traveling earlier in the week and I have been collecting the latest schedule information from the various fabrication shops since I returned. The current status is as follows:

Thermocouples are expected to ship on or before 3/21/08.

30 fuel injector elbows are fabricated and are in the process of ceramic lining.

The remaining 18 will be fabricated as the first 30 are lined with lining of these 18 to follow.

The completed elbows are expected to be ready to ship to you on or before 3/15.

All fuel injector barrels are fabricated. Fabrication of other fuel injector components is ongoing while these items are out for ceramic lining.

At this time 32 fuel injector barrels have been ceramic lined and returned to the fabrication shop.

The balance will be back in the shop by 2/15.

The critical path is the burner tip castings with internal tungsten carbide spray lining.

The first 2 castings were inspected and approved by ABT at the foundry on 1/25.

Current Production Schedule is as follows:

A total of 17 castings will be poured and lined by 2/22.

IP7020973

12 more by 2/29.

The remaining 19 will follow with last item lined by 3/14.

Complete fabrication and delivery of the first 24 fuel injectors is expected by 3/28.

I expect to make a subsequent shipment the week of 4/7 with the final shipment of fuel injectors expected to be on site by 4/18.

Best Regards,

Kenneth V. Tichy, P.E.

Project Manager

Advanced Burner Technologies

A SIEMENS Company

271 Route 202/206

PO Box 410

Pluckemin, NJ 07978

ken.tichy@siemens.com

PHONE: 908.212.0571

FAX: 908.470.0479

CELL: 908.391.2175

-----Original Message-----

From: Garry Christensen [mailto:Garry-C@ipsc.com]

Sent: Monday, February 04, 2008 11:47 AM

To: Tichy, Ken V O6473

Subject: Burner elbows and injectors for Intermountain Power

IP7020974

Ken, my name is Garry Christensen and I am over the burners here at Intermountain. I was given your name as the Project Manager for our injectors and elbows which are scheduled to be delivered by the 28th of March. I would like to keep an open dialogue as to their progress in manufacturing and possible delivery dates. Please reply back with your phone number, etc. I look forward to working with you.

Intermountain Power Service Corp.

Performance Engineer

850 W. Brush Wellman Road

Delta, Utah 84624-8546

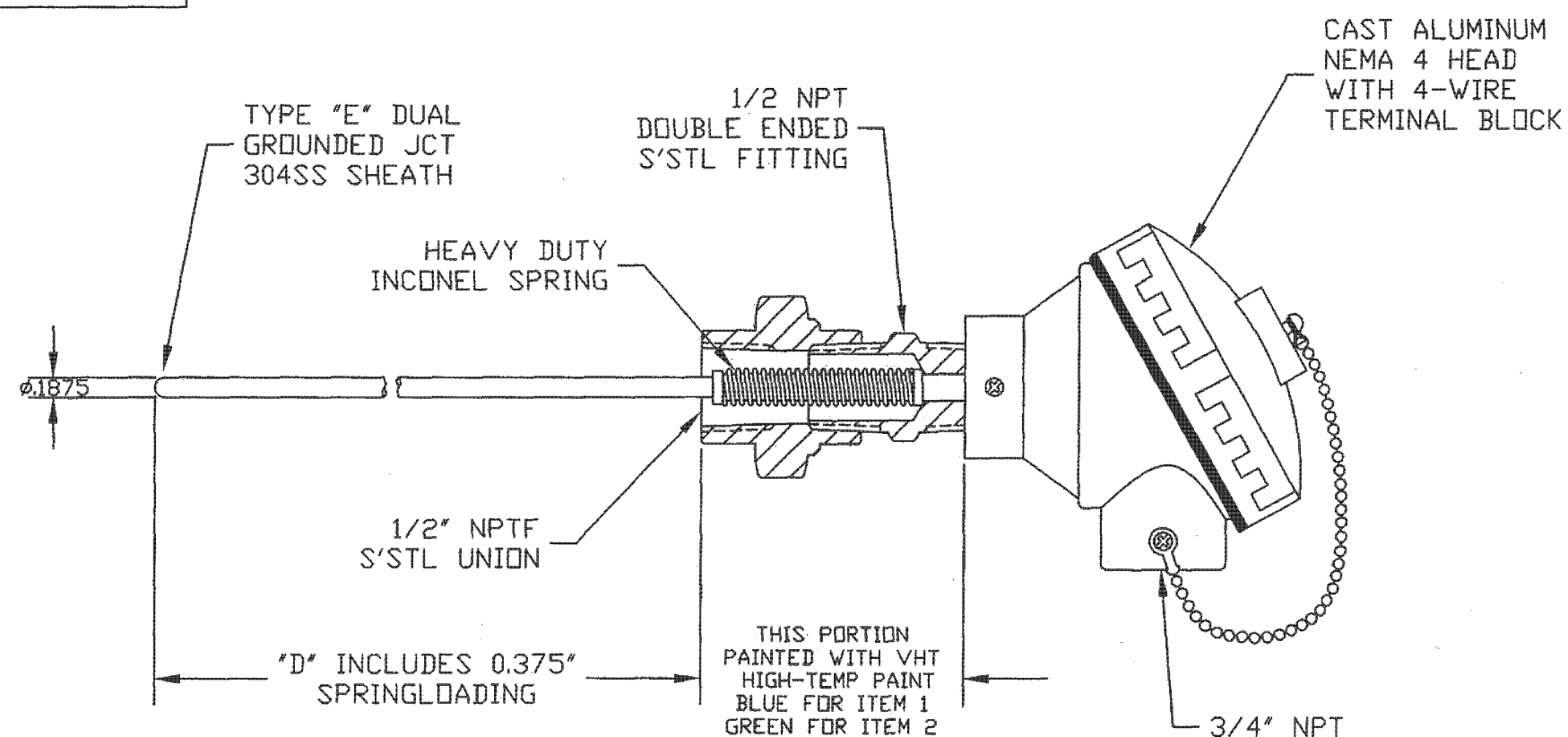
garry-c@ipsc.com (<mailto:garry-c@ipsc.com>)

Telephone (435) 864-6486

IP7020975

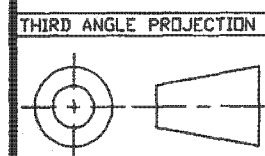
ACAD DWG NO MANUAL REVISIONS
 INTERPRET PER ANSI Y14.5
 DO NOT SCALE DRAWING

REV
 ST-8866B-[]



NO SPECIAL INSTRUCTIONS FOR INSTALLATION.
 PUSH T/C INTO TUBE AND TIGHTEN UNION.
 3/16 MIC WILL BEND EASILY TO FIT NOZZLE.

Item No.	Qty Required	"D" Dim	Item Description	Part Number
1	48	105.69	Fuel Injector Nozzle	ST-8866B-1
2	48	69.97	Fuel Body Temp	ST-8866B-2



REV.	DESCRIPTION	BY	DATE
		200 INDUSTRIAL DRIVE NORTHAMPTON, MA 01060 PHONE: (413) 584-3165 FAX: (413) 586-3625	
MATERIAL:		THERMOCOUPLE ASM	
FINISH:	DWN: T. CARROLL	TOLERANCES UNLESS OTHERWISE NOTED: DECIMAL ± 0.010	
DATE	12/13/07	SCALE	FRACTION ± 1/32 ANGLE ± 2°
CAD FILENAME:	CHECKED	APP'D	SURFACE SMOOTHNESS 63
ST8866B			ST-8866B-[]

FYI

Subject: RE: Intermountain Replacement Burners

1. Attached are Installation Drawings for Transmittal to Customer.
Please let me know if you have any questions, comments or concerns.

Best Regards,

Kenneth V. Tichy, P.E.
Project Manager
Advanced Burner Technologies
A **SIEMENS** Company
271 Route 202/206
PO Box 410
Pluckemin, NJ 07978
ken.tichy@siemens.com
PHONE: 908.212.0571
FAX: 908.470.0479
CELL: 908.391.2175

From: Tichy, Ken V O6473
Sent: Tuesday, December 11, 2007 9:26 AM
To: Allen, Robert J O642
Subject: RE: Intermountain Replacement Burners

No but Sal asked me to check. Hence my e-mail of 11/16.

Best Regards,

Kenneth V. Tichy, P.E.
Project Manager
Advanced Burner Technologies
A **SIEMENS** Company
271 Route 202/206
PO Box 410
Pluckemin, NJ 07978
ken.tichy@siemens.com
PHONE: 908.212.0571
FAX: 908.470.0479
CELL: 908.391.2175

From: Allen, Robert J O642
Sent: Tuesday, December 11, 2007 9:23 AM
To: Tichy, Ken V O6473
Subject: RE: Intermountain Replacement Burners

Ken,
Are these thermocouples any different than what is installed in the existing burners?
Bob Allen

file://N:\Current\Projects\IGS07\IGS07-02 Unit 2 Burner Injector Replacement - GC\4.Correspo... 12/20/2010

IP7020977

From: Tichy, Ken V 06473
Sent: Monday, December 10, 2007 4:58 PM
To: Allen, Robert J 0642
Subject: RE: Intermountain Replacement Burners

Bob,

I need to go ahead with the Intermountain Thermocouple order this week to meet delivery. Attached is a supplement to the information sent 11/16. This is what I will go with unless I hear otherwise.

Best Regards,

Kenneth V. Tichy, P.E.
Project Manager
Advanced Burner Technologies
A SIEMENS Company
271 Route 202/206
PO Box 410
Pluckemin, NJ 07978
ken.tichy@siemens.com
PHONE: 908.212.0571
FAX: 908.470.0479
CELL: 908.391.2175

From: Tichy, Ken V 06473
Sent: Friday, November 16, 2007 5:36 PM
To: Allen, Robert J 0642
Subject: Intermountain Replacement Burners

Bob,

Can you check with the customer with regard to the thermocouples? In the past we provided a waterproof head that they wire into (sketch attached). Please confirm that this arrangement is best for them.

Thanks

Best Regards,

Kenneth V. Tichy, P.E.
Project Manager
Advanced Burner Technologies
A SIEMENS Company
271 Route 202/206
PO Box 410
Pluckemin, NJ 07978
ken.tichy@siemens.com
PHONE: 908.212.0571
FAX: 908.470.0479
CELL: 908.391.2175

file://N:\Current\Projects\IGS07\IGS07-02 Unit 2 Burner Injector Replacement - GC\4.Correspo... 12/20/2010

IP7020978

ADVANCED BURNER TECHNOLOGIES

271 Route 202/206
P.O. Box 410
Pluckemin, New Jersey 07978
Phone: 908-470-0470; FAX: 908-470-0479

DRAWING TRANSMITTAL
A07008 IPSC
IGS - UNIT 2

TO: R. ALLEN

DATE: 12/17/2007

FROM: K. TICHY

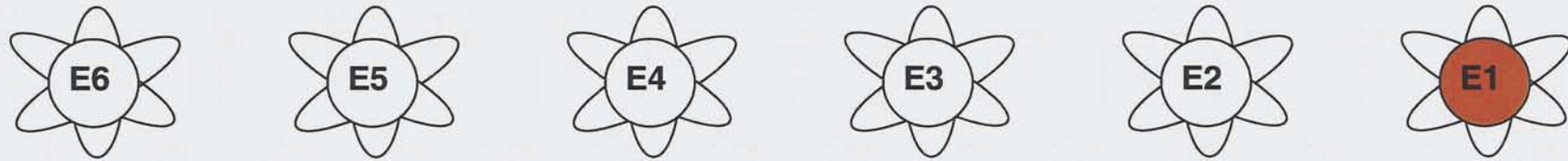
SUBJECT: INSTALLATION DRAWINGS - IPSC

CODE	DRAWING NUMBER	REV	DRAWING TITLE
2, 5	07008-100-A97-0	1	Opti-Flow Burner Fuel Injector Installation
2, 5	ST-8866B	0	Thermocouple Assembly

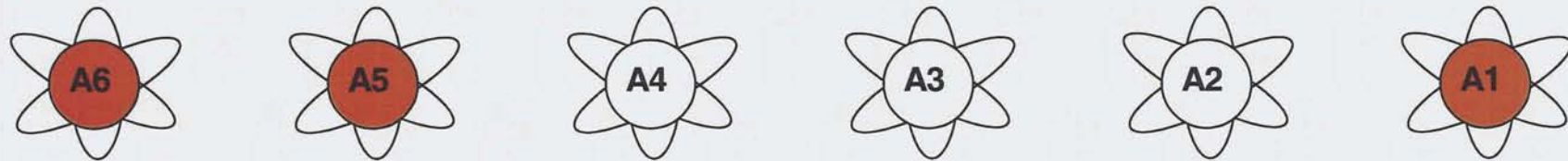
CODE

- 1 FOR REVIEW
- 2 FOR ISSUE
- 3 FOR INFORMATION
- 4 FOR COMMENT
- 5 FOR MANUFACTURE
- 6 OTHER

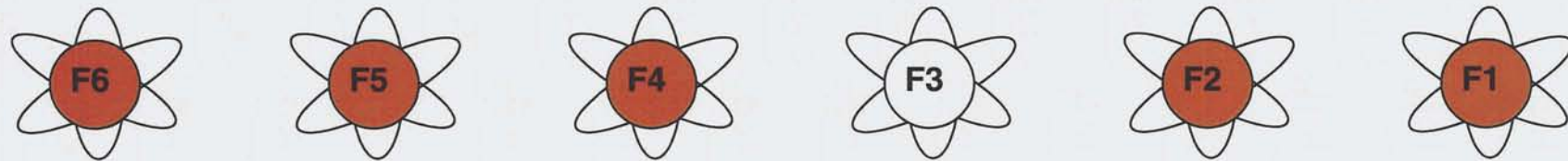
Air flow dividers designated to replace. Additional ones may be added after injectors pulled.
8th Floor



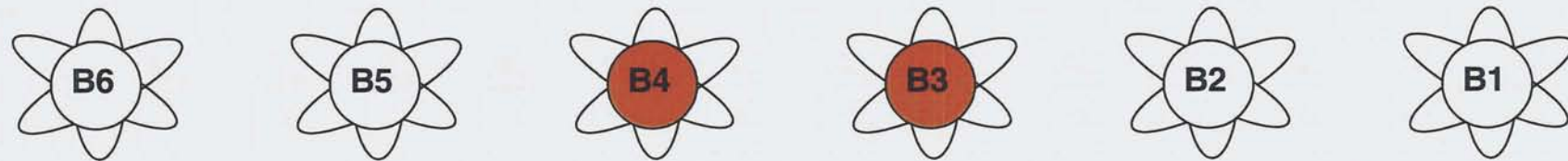
7th Floor



6th Floor



5th Floor

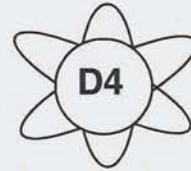
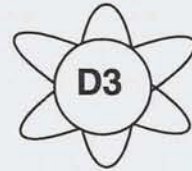
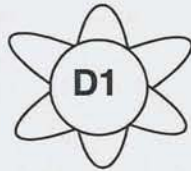


West

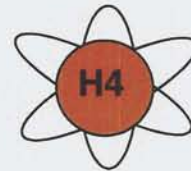
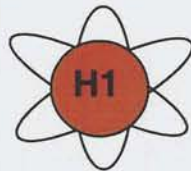
Front wall looking North

East

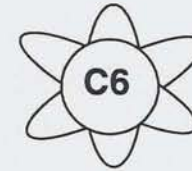
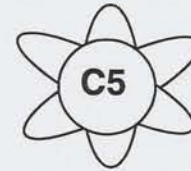
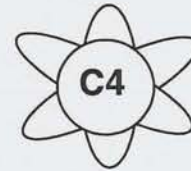
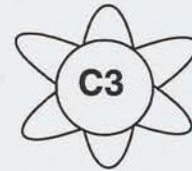
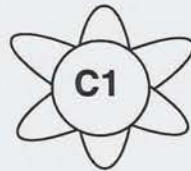
8th Floor



7th Floor



6th Floor



5th Floor



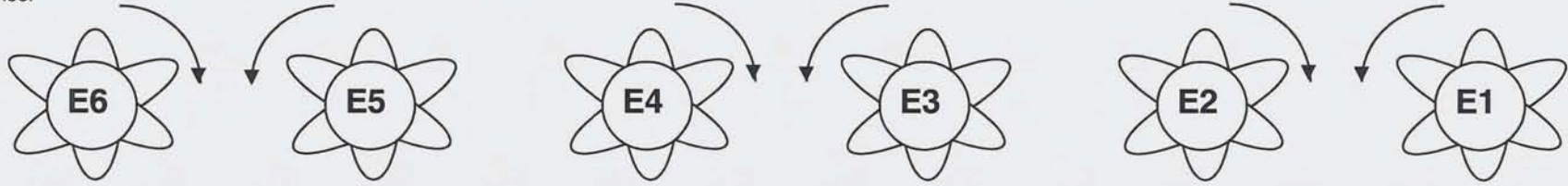
East

Rear Wall Looking South

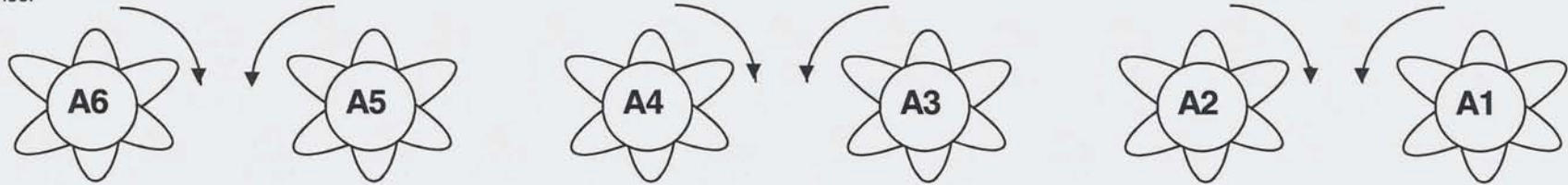
West

Tips removed and replaced designated in yellow, all others were repaired with segment wear liners on all 6 pedals.

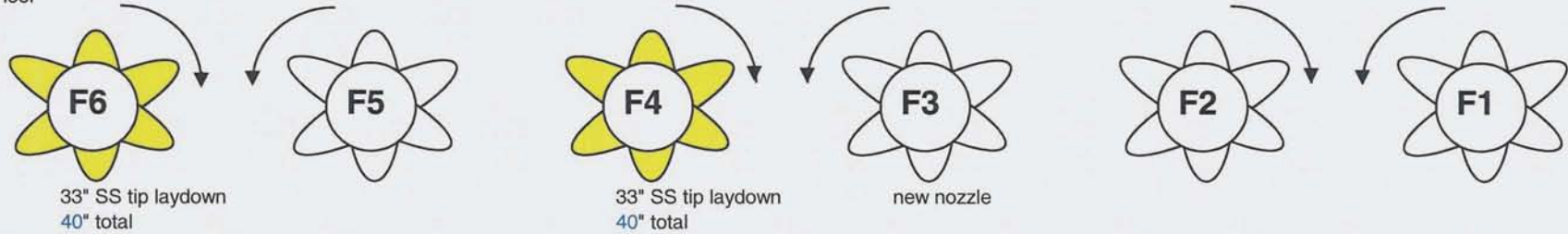
8th Floor



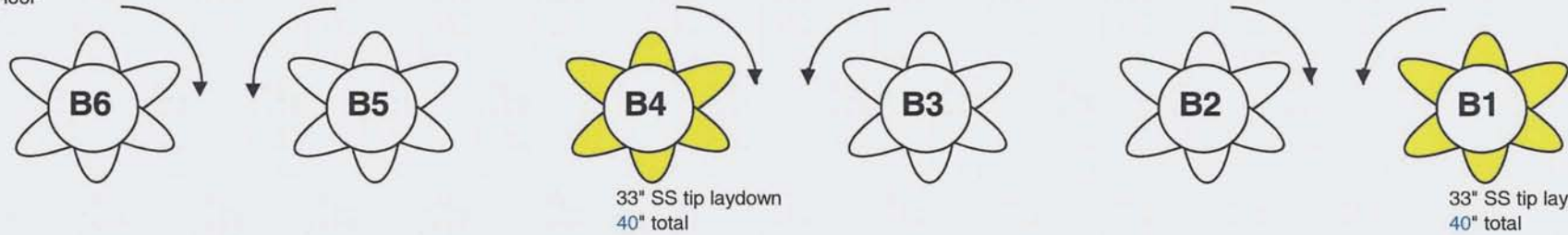
7th Floor



6th Floor



5th Floor

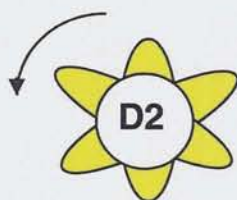
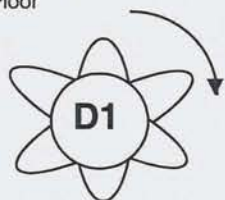


West

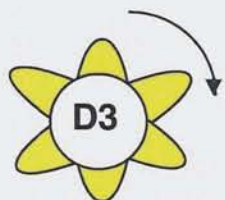
Front wall looking North (Tips to have air sleeve moved back.) **Tip to be replaced**

East

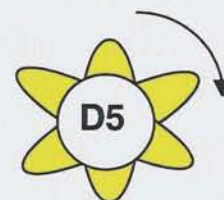
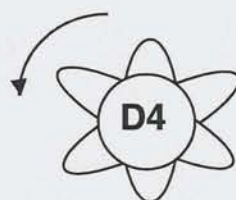
8th Floor



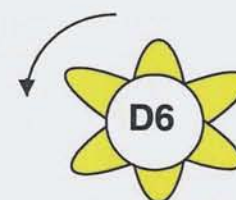
33" SS tip laydown
40" total



33" PI 2000 old burner
40" total

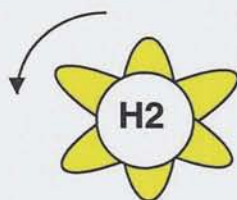
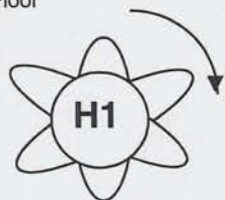


33" PI 2000 old burner
40" total

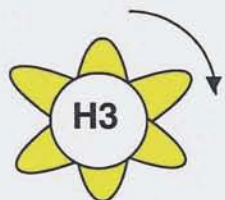


33" PI 2000 old burner
40" total

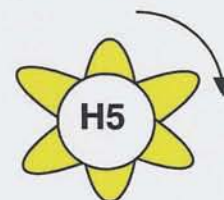
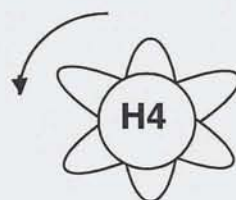
7th Floor



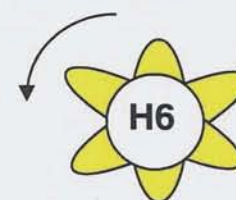
33" PI 2000 old burner
40" total



33" PI 2000 old burner
40" total

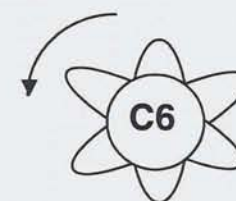
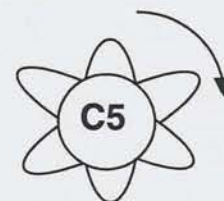
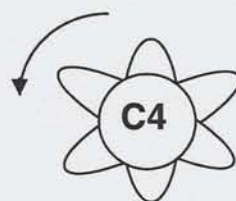
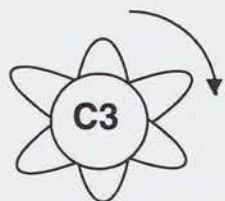
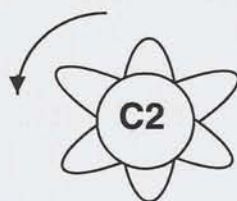
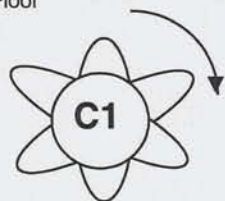


42" SS from PI

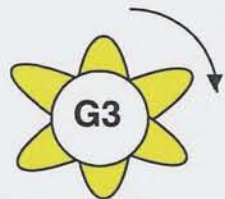
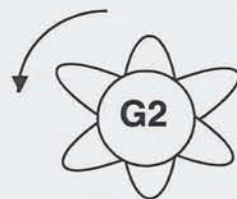
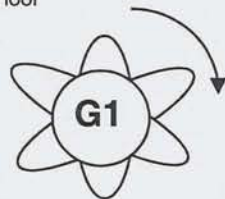


40" SS tip laydown

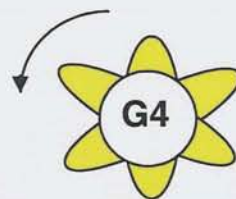
6th Floor



5th Floor



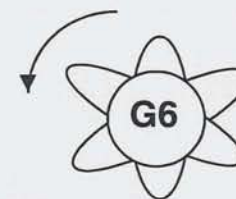
33" PI 2000 old burner
40" total



33" SS tip laydown
40" total



33" SS tip laydown
40" total



East

Rear Wall Looking South (Tips to have air sleeve moved back) **Tip to be replaced**

West

Unit 2			At time unit off-line		3/28/2008	Startup after outage		4/26/2008
			Spin Vanes	Inner Air	Outer Register	Spin Vanes	Inner Air	Outer Register
Front	Pulv	E1	4.0	2 7/8	8.0	4.0	3 7/8	8.0
		E2	4.0	2 7/8	5.5	4.0	3 7/8	5.5
	E	E3	4.0	2 7/8	5.5	4.0	3 7/8	5.5
		E4	4.0	2 7/8	5.5	4.0	3 7/8	5.5
		E5	4.0	2 7/8	5.5	4.0	3 7/8	5.5
		E6	4.0	2 7/8	8.0	4.0	3 7/8	8.0
	Pulv	A1	4.0	2 7/8	8.0	4.0	3 7/8	8.0
		A2	4.0	2 7/8	5.5	4.0	3 7/8	5.5
	A	A3	4.0	2 7/8	5.5	4.0	3 7/8	5.5
		A4	4.0	2 7/8	5.5	4.0	3 7/8	5.5
		A5	4.0	2 7/8	5.5	4.0	3 7/8	5.5
		A6	4.0	2 7/8	8.0	4.0	3 7/8	8.0
	Pulv	F1	4.0	2 7/8	8.0	4.0	3 7/8	8.0
		F2	4.0	2 7/8	5.5	4.0	3 7/8	5.5
	F	F3	4.0	2 7/8	5.5	4.0	3 7/8	5.5
		F4	4.0	2 7/8	5.5	4.0	3 7/8	5.5
		F5	4.0	2 7/8	5.5	4.0	3 7/8	5.5
		F6	4.0	2 7/8	8.0	4.0	3 7/8	8.0
	Pulv	B1	4.0	2 7/8	9.0	4.0	3 7/8	9.0
		B2	4.0	2 7/8	5.5	4.0	3 7/8	5.5
	B	B3	4.0	2 7/8	5.5	4.0	3 7/8	5.5
		B4	4.0	2 7/8	5.5	4.0	3 7/8	5.5
		B5	4.0	2 7/8	5.5	4.0	3 7/8	5.5
		B6	4.0	2 7/8	9.0	4.0	3 7/8	9.0
Rear	Pulv	D1	4.0	2 7/8	8.0	4.0	3 7/8	8.0
		D2	4.0	2 7/8	5.5	4.0	3 7/8	5.5
	D	D3	4.0	2 7/8	5.5	4.0	3 7/8	5.5
		D4	4.0	2 7/8	5.5	4.0	3 7/8	5.5
		D5	4.0	2 7/8	5.5	4.0	3 7/8	5.5
		D6	4.0	2 7/8	8.0	4.0	3 7/8	8.0
	Pulv	H1	4.0	2 7/8	8.0	4.0	3 7/8	8.0
		H2	4.0	2 7/8	5.5	4.0	3 7/8	5.5
	H	H3	4.0	2 7/8	5.5	4.0	3 7/8	5.5
		H4	4.0	2 7/8	5.5	4.0	3 7/8	5.5
		H5	4.0	2 7/8	5.5	4.0	3 7/8	5.5
		H6	4.0	2 7/8	8.0	4.0	3 7/8	8.0
	Pulv	C1	4.0	2 7/8	8.0	4.0	3 7/8	8.0
		C2	4.0	2 7/8	5.5	4.0	3 7/8	5.5
	C	C3	4.0	2 7/8	5.5	4.0	3 7/8	5.5
		C4	4.0	2 7/8	5.5	4.0	3 7/8	5.5
		C5	4.0	2 7/8	5.5	4.0	3 7/8	5.5
		C6	4.0	2 7/8	8.0	4.0	3 7/8	8.0
	Pulv	G1	4.0	2 7/8	9.0	4.0	3 7/8	9.0
		G2	4.0	2 7/8	5.5	4.0	3 7/8	5.5
	G	G3	4.0	2 7/8	5.5	4.0	3 7/8	5.5
		G4	4.0	2 7/8	5.5	4.0	3 7/8	5.5
		G5	4.0	2 7/8	5.5	4.0	3 7/8	5.5
		G6	4.0	2 7/8	9.0	4.0	3 7/8	9.0

In 7th hole
starting at totally
open

In 5th hole
starting at totally
open

From: Jerry Finlinson
To: Jim Knapp
CC: Garry Christensen; Howard Scott
Date: 3/11/2009 12:11 PM
Subject: Fwd: Temp-Pro Proposal 031109NM01
Attachments: Proposal #031109NM01.doc

Jim,

Here's a quote I got from Temp Pro for 4 spare ABT burner thermocouples of each length. They are above \$300 each.

Jerry

Jerry Finlinson, Control Engineer
Intermountain Power Service Corp
850 West Brush Wellman Rd
Delta, UT 84624
435-864-6466 FAX 0776
cell 435-406-4754
jerry-f@ipsc.com

There's always more to do than you can do. Prioritize!

>>> "Neal Messier" <Neal.messier@temp-pro.com> 3/11/2009 12:00 PM >>>
Jerry,

Please see attached proposal 031109NM01 in regards to your RFQ. Thank you for this opportunity to quote your requirements. We are available at your convenience to respond to any questions arising from review of our proposal.

I look forward to your response.

Regards,

Neal Messier

Sales Engineer
TEMP-PRO INC.
<<mailto:neal.messier@temp-pro.com>>
Main: 413.584.3165 x228
Fax: 413.586.3625
<<http://www.temp-pro.com/>>

The information contained in this communication is confidential and privileged proprietary information intended only for the individual or entity to whom it is addressed. Any unauthorized use, distribution, copying or disclosure of this communication is prohibited. If you have received this communication in error, please contact the sender immediately.

IP7020987

CAPITAL PROJECT JUSTIFICATION 2007-2008

JOB.NO: IGS07-B W.O. # 06-03474-0

TITLE: Unit 2 burner injector / burner replacement

DESCRIPTION: Repair or replace all 48 ABT burner nozzles during the 2008, Unit 2 outage.

JUSTIFICATION: OBSOLESCENCE

WHAT IS OBSOLETE: ABT burner injector
WHY OBSOLETE: Damaged during operation
WHEN OBSOLETE: Needed for 2008 Planned Outage
WHY IS IT STILL NEEDED: ABT burner deficiencies

ADDITIONAL DETAIL: Severe damage found during 2006 planned outage. Repaired/patched as best as possible with time allowed.

COST ESTIMATE:

	07-08
Engineering Labor	\$ 2,000
Installation Labor	\$ 360,500
Contractor Labor	\$ 0
Material	\$2,214,500
Job Total	\$2,577,000

ALTERNATIVES: none

EFFECT OF DEFERRAL: Damaged burners may result in loss of generation and possibly an extended forced outage..
Existing ABT burners only made it two years due to an apparent design problem with the original purchased burners.

CAPITAL PROJECT JUSTIFICATION 2007-2008

PROJECT HISTORY: ABT burners were purchased and installed Spring 2004 on Unit 2. Damage to burners were found during an inspection on F row following a burner line fire October 2005. Burners continued to show increased erosion problems. Coal tip segment wear liners and a diffuser/wear liner for the injector were purchased and installed during the 2006 planned outage due to time and money constraints.. Severe cracking of the injector tip was also found on many burners during the planned outage. 15 of the worst tips were removed and replaced with another design.

INTERMOUNTAIN POWER SERVICE CORPORATION

☒ REQUISITION FOR CAPITAL EQUIPMENT

☐ PURCHASE AUTHORIZATION FOR EXPENSE ITEMS

Purpose of Materials, Supplies or Services:

Purchase of fuel injectors, x-vanes, and flat back elbows for Unit 2 burner outage repairs Spring 2008.

Date: 27-Nov-07
Req./PA No: 234399
P.O. No:
Vendor:
Terms:
FOB:
Ship Via:
Conf. To:

Suggested Vendor: Siemens Power Generation
440 Alafaya Trail MC Q1-101
Orlando, FL 32826

Account No. 00-2SGX-402
Work Order No. 06-03474
Project No. IGS07-02

Qty	Unit	Noun	Description Adjective	Catalog #	Seller or Manufacturer	Unit Cost	Extension
48	ea	Fuel Injectors				\$12,864.58	\$617,500.00
48	ea	x-vane				\$1,354.17	\$65,000.00
48	ea	flat back elbows				\$4,062.50	\$195,000.00
		TOTAL ESTIMATED COST					\$877,500.00

Remarks: Repairs and material cost agreement from October 31, 2007 meeting with Siemens (Tom Cochran, Bob Allen, John Gallagher) and IPSC (George Cross, Dennis Killian, Jerry Hintze, Garry Christensen) at IPSC.

Delivery requested by [Date] 03-28-08 Originator Garry Christensen

Dept. Mgr/Supt.	Date	Station Manager	Date	Operating Agent	Date
-----------------	------	-----------------	------	-----------------	------

IP7020991

MEMORANDUM

INTERMOUNTAIN POWER SERVICE CORPORATION

TO: George W. Cross

Page 1 of 1

FROM: Dennis K. Killian

DATE: September 13, 2007

SUBJECT: Manual Requisition Approval for Failure Analysis on Burner Tip

Please approve the attached manual requisition for a failure analysis to be performed by Thielsch Engineering on an Advanced Burner Technology (ABT) burner tip.

In the August 1, 2007 meeting at IPSC, Robert Allen from Siemens stated that from their analysis, the primary failure mechanism was erosion/thinning and then cracking propagated from the thinned areas. Technical Services personnel have also seen cracking not attached to any erosion areas and feel that an independent failure analysis on a failed ABT tip would be beneficial. This evaluation is not for contention purposes but to help verify and cover any other failure mechanisms so the new design will be successful.

The analysis work will be charged to work order 06-03474 Capital Project IGS07-2.

Any questions regarding this request may be directed to Garry Christensen at extension 6486.

GC/DEW:jmj
Attachment

IP7020992

TEMP-PRO Inc.
200 Industrial Drive, PO Box 89
Northampton, MA 01061

Phone: (800) 991 9093
(413) 584 3165 x228

Fax: (413) 586 3625
Email: neal.messier@temp-pro.com

Page __1__ of 2

PROPOSAL

To: INTERNATIONAL POWER				
Attn: JERRY			Fax:	
Project :			Tel: 435-633-6439	
Reference:			Temp-Pro Quote #: 031109NM01	
Prices firm for: 30 Days	Terms: N30 Days	Delivery: Below	FOB: Nothampton,MA.	Date: 3/11/09

Item No.	Qty	Description/Part Number	Each	TOTAL
		Please find attached our proposal for fabrication and supply of the temperature sensing commodities outlined within your bid package referenced above. Included are: 1. Pricing 3. Item Description 4. Delivery		

Thank you for this opportunity to quote your requirements. We are available at your convenience to respond to any questions arising from review of our proposal.

Regards,
Neal Messier

TEMP-PRO Inc. Your source for: - thermocouples, rtd's, thermowells, protection tubes, junction boxes, transmitters, controllers, indicators, electrical assemblies.

IP7020993

TEMP-PRO Inc.
200 Industrial Drive, PO Box 89
Northampton, MA 01061

Quote # 031109NM01

Description: FUEL INJECTOR NOZZLE T/C

ST-8866B-1

QTY: 4

Price: \$323.08

Total: \$1,292.32

Description: FUEL INJECTOR NOZZLE T/C

ST-8866B-2

QTY: 4

Price: \$303.08

Total: \$1,212.32

Ship Date: 4-5 Weeks ARO

Total Material: \$2,504.64

Freight: Pre-Pay & Add

Terms based on credit reference check at time of order.

Regards,

Neal Messier
Sales Engineer

TEMP-PRO Inc. Your source for: - thermocouples, rtd's, thermowells, protection tubes, junction boxes, transmitters, controllers, indicators, electrical assemblies.

IP7020994

Intermountain Generating Station
Unit 2 Burner Injector and Burner Elbow Replacement

Project Description

Replacement of all 48 burner elbows and burner injectors.

The existing burner injectors and burner elbows will be replaced with new injectors and sweep elbows provided by Siemens. The replaced injectors and elbows will be removed from the unit to a designated area. Burners are located on the 5th through the 8th level on the unit.

Scope of Work.:

1. Removal of old burner elbow on all 48 burners. (Just like 2006 outage)
 - a. Removal of welded TC from burner pipe.
 - b. Install needed rigging for burner pipe support.
 - c. Burner elbow removal by row.
 - d. Removal of old elbows to designated area outside of unit.
 - e. Clean flange mating surface.
2. Removal of old burner injector on all 48 burners. (Just like 2006 outage, 2000 # each)
 - a. Removal of lagging and insulation needed to unbolt injector.
 - i. Can happen at earlier sequence.
 - b. Unbolt injector and pull out of burner. Clean ash before pulling injector out.
 - c. Removal of old injectors to designated area outside of unit.
3. Clean up burner casing prior to installation of new injector.
 - a. Guzzle up all ash in burner casing and all ash that has fallen into burner secondary air opening.
 - b. Repair burner casings as needed. ** Inspection 2 years ago showed damage on several burner casings per row. We will not know the extent of repairs needed until injector pulled.
4. Installation of 48 new burner injectors.
 - a. Unload upon arrival and mobilize new burner injectors to appropriate burner rows.
 - b. Install new burner injectors by sliding into burner casing and bolting up to burner housing with gasket material.
 - c. Install insulation and lagging. (Can be installed after elbow installation)
5. Installation of 48 new flat back burner elbows.
 - a. Unload upon arrival and mobilize new burner flat back elbows to appropriate burner rows.
 - b. Position and bolt up 48 new burner elbows with gasket material.

6. General cleanup following completion of installation.
7. Painting
 - a. After completion of installation (April 21, 2008 at 07:00) IPSC painters to prep elbows and paint. Stencil elbows for identification. i.e. C-1, C-2,....
8. Schedule:
 - a. Injectors and flat back elbows:
 - i. Start of work: March 28, 2008 or as soon as required materials are on site.
 - ii. Completion: Installation and inspections of burner injector and elbows by April 21, 2008 at 07:00
9. Materials:
 - a. Materials to be supplied by Siemens.
 - i. Burner fuel injector.
 - ii. Flat back elbows with x-vane.
 - b. Materials supplied by IPSC.
 - i. Gasket material for burner elbow flanges.
 - ii. Gasket material for injector to burner housing.
 - iii. 253 MA material to repair burner casings.
 - c. The contractor shall be responsible for providing weld rod, all additional parts, tools, and/or materials including insulation and lagging required for the completion of this job.

ABT 2006 Spring Outage

Material	
Segment Wear Liners	\$ 107,100.00
Fuel Injector diffuser/wear liner	\$ 92,000.00
Ceramic Bricks	\$ 7,050.00
Tips, 309SS 42" from PI	\$ 4,570.00
Throat Segments	
# bags Super Abrade	\$ 798.00
F3 burner 06-48595	

Sub Total \$ 211,518.00

Total Material

Labor	
PO Release 320	\$ 256,834.00
PO Release 319	\$ 21,000.00
F3	\$ 6,183.00

Sub Total \$ 284,017.00

Total \$ 495,535.00

2008

ABT	Unit Price	Quantity	Total
Fuel Injectors price each	\$ 36,300.00	48	\$ 1,742,400.00
shipping		10%	\$ 174,240.00
taxes			\$ 12,196.80
misc			\$ 20,000.00
total materials + 10%			\$ 2,143,720.48

15% discount if ordered by June 15, 2006

Labor \$ 350,000.00

sub total \$ 2,493,720.48

3% inflation \$ 2,568,532.09

2008

Power Industrial (PI)

	Unit Price	Quantity	Total
Coal Nozzles	\$ 7,250.00	48	\$ 348,000.00
Conical Diffuser	\$ 1,225.00	48	\$ 58,800.00
Coal Deflector	\$ 360.00	48	\$ 17,280.00
Seal Plate	\$ 250.00	48	\$ 12,000.00
misc			\$ 20,000.00
		sub total	\$ 456,080.00
material change +20%			\$ 547,296.00
shipping 10%			\$ 54,729.60
taxes			\$ 3,831.07
Total materials			\$ 605,856.67

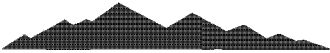
Labor Total labor \$ 350,000.00

Total	\$ 955,856.67
-------	---------------

Tip Only Option

	Unit Price	Quantity	Total
Coal Tip	\$ 4,110.00	48	\$ 197,280.00
	material change	20%	\$ 236,736.00
	misc		\$ 20,000.00
	shipping		\$ 19,728.00
	taxes		\$ 1,380.96
	Total materials		\$ 277,844.96
	Total Labor		\$ 350,000.00
	Total		\$ 627,844.96

IPSC



INTERMOUNTAIN POWER SERVICE CORPORATION

Document Tracking Form

Capital Project No.: IGS07-02Title: Unit 2 Burner Injector ReplacementPrepared By: Garry ChristensenIPSC Work Order # 06-03474Date: August 13, 2007Supervisor: Dean WoodPage 1 of 3**Item 1 - Construction Drawings**

Drawing Number	Rev. No.	Comments	Tag (X)	Available in current, waiting closeout	Date Submitted for Closeout	Date Closed Out
9255-2SGA-M2063D	13	Steam Generator	X			
9255-2SGA-M2063E	10	Steam Generator	X			
9255-2SGA-M2063F	10	Steam Generator	X			
9255-2SGA-M2063G	10	Steam Generator	X			
9255-2SGA-M2063H	10	Steam Generator	X			
9255-2SGA-M2063I	10	Steam Generator	X			
9255-2SGA-M2063J	10	Steam Generator	X			
9255-2SGA-M2063K	10	Steam Generator	X			

Item 2 - Manufacturer's Drawings

Drawing Number	Rev. No.	Comments	Available in current, waiting closeout	Date Submitted for Closeout	Date Closed Out
----------------	----------	----------	--	-----------------------------	-----------------

IP7020999

IPSC



INTERMOUNTAIN POWER SERVICE CORPORATION

Document Tracking Form

Capital Project No.: IGS07-02
 Title: Unit 2 Burner Injector Replacement
 Prepared By: Garry Christensen

IPSC Work Order # 06-03474
 Date: August 13, 2007
 Supervisor: Dean Wood
 Page 2 of 3

Item 3 - Instruction Manuals

Instruction Manual Number	Title	Vol.	Comments/ Instruction	Date Submitted for Closeout	Date Closed Out
------------------------------	-------	------	--------------------------	-----------------------------------	--------------------

Item 4 - System Descriptions

System Code	System Title/Page	Comments/ Instructions	Date Submitted for Closeout	Date Closed Out
-------------	-------------------	---------------------------	-----------------------------------	--------------------

Item 5 - DATATRAK Revisions

Device Number	New/ Revised/ Deleted	Comments	Date Submitted for Closeout	Date Closed Out
------------------	-----------------------------	----------	-----------------------------------	--------------------

Item 6 - I & C Database Revisions

Devise Number	New/ Revised/ Deleted	Comments	Date Submitted for Closeout	Date Closed Out
---------------	-----------------------------	----------	-----------------------------------	--------------------

Item 7 - Ladder Logic Revisions

IP7021000

IPSC



INTERMOUNTAIN POWER SERVICE CORPORATION

Document Tracking Form

Capital Project No.: IGS07-02
Title: Unit 2 Burner Injector Replacement
Prepared By: Garry Christensen

IPSC Work Order # 06-03474
Date: August 13, 2007
Supervisor: Dean Wood
Page 3 of 3

Devise Number	New/ Revised/ Network #	Comments	Date Submitted for Closeout	Date Closed Out
---------------	----------------------------------	----------	-----------------------------------	--------------------

Item 8 - Relay Manual Updates

Manual and Page #	Relay #	Comments	Date Submitted for Closeout	Date Closed Out
-------------------	---------	----------	-----------------------------------	--------------------

Item 9 - Miscellaneous Documentation

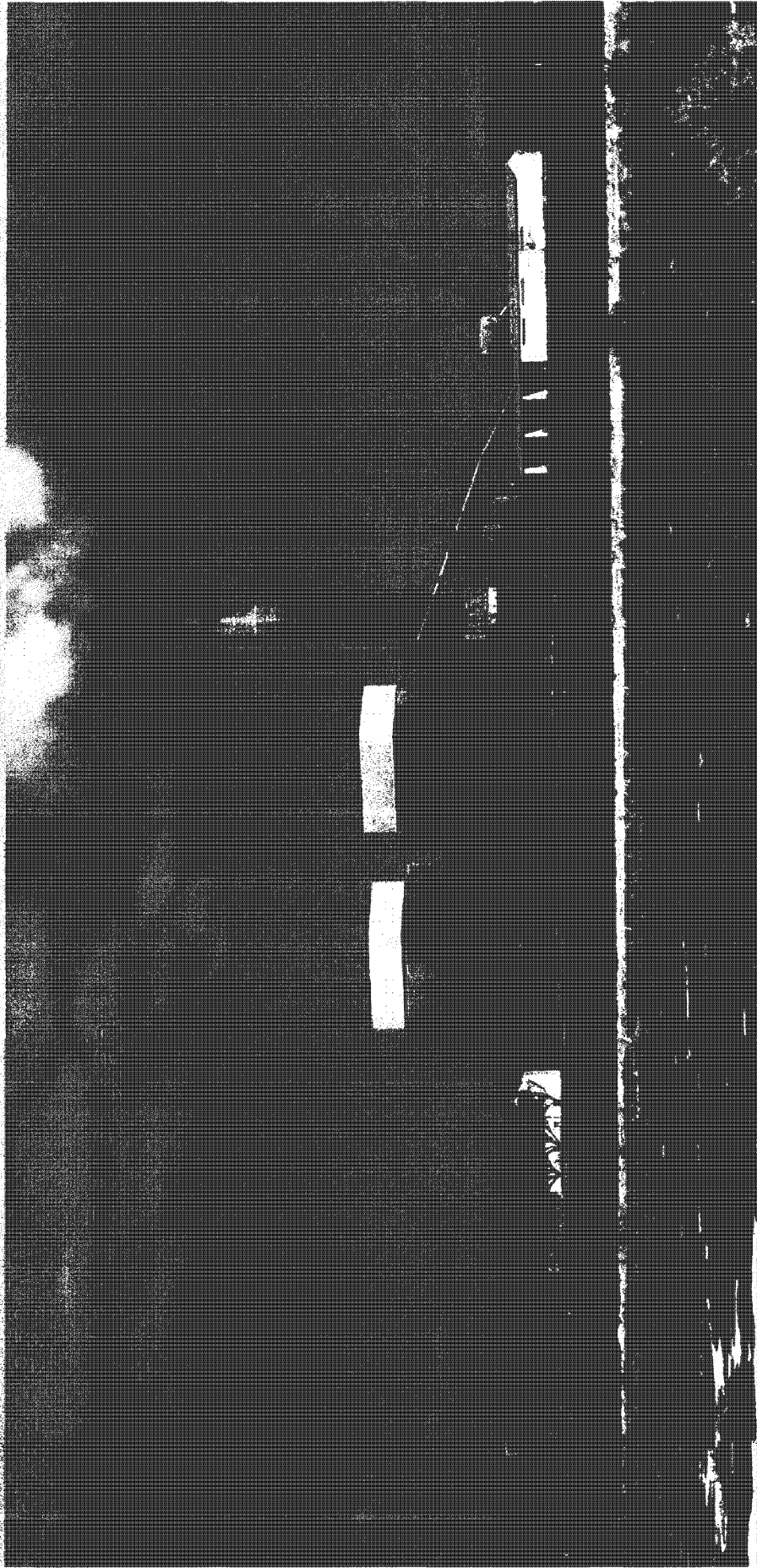
Description	Date Submitted for Closeout	Date Closed Out
-------------	-----------------------------------	--------------------

IP7021001

IP7021003

**Intermountain Power Service Corp.
ABT Siemens Warranty Claim**

SIEMENS



Date: October 17, 2007

Intermountain Power Service Corp ABT Siemens Warranty Claim

SIEMENS

ABT was awarded a contract in 2003 for the material supply of low NOx burners replacing existing B&W burners that had operated since 1992.

The base contract was for material supply only of 48 low NOx burners, 48 ABB Scanners plus air flow measuring equipment.

Approximately one year after commercial operation, the unit suffered a fire in one burner that destroyed the fuel injector. During the following Spring outage, inspection revealed additional nozzles had cracks and excessive thinning of the fuel piping and nozzles.

April 2007, Siemens BTS and IPSC initiated a Six Sigma investigation to determine the root cause of the problems with the burners.

Siemens BTS and IPSC agreed on an issue statement with the five items:

- 1.) The alloy nozzle tip is cracking
- 2.) There is material loss at the following locations:
 - The burner nozzle tip
 - The "X" vane at the coal pipe elbow
 - The burner barrel
- 3.) The burner barrel is experiencing permanent deformation
- 4.) Establish the correct primary airflow for normal operation
- 5.) Definition of requirements for cooling air when the burner is out of service

Intermountain Power Service Corp ABT Siemens Warranty Claim

SIEMENS

The Six Sigma Root Cause analysis followed the five steps for a Six Sigma Project

Define: clear definition of the problem and the aim of the project

During the define stage, all available correspondence was collected, contract documents were collected, the involved parties were interviewed and an Issue Statement developed and agreed to.

Measure: Examination of the current process and collection relevant data for future analysis

The ABT design records were reviewed, the existing pulverizer performance at IPSC was documented and metallurgical analysis of the cracked burner nozzle was performed.

Analyze: Evaluation of the measured results and identification of the actual cause of the problem

CFD analysis and thermal modeling of the nozzles using the operating parameters as measured during the pulverizer testing was performed. A root cause analysis was generated.

Improve: Selection and implementation of the solution

A new burner design was generated using the information collected during the Define and Measure stage and CFD analysis undertaken to verify changes will

Control: Control of the changed process

The differences between the original design and the revised design need to be implemented and documented

Intermountain Power Service Corp ABT Siemens Warranty Claim

SIEMENS

Executive Summary

The alloy nozzle tip cracking is the result of erosion of the wall thickness in the nozzle due to higher than original air and coal flow. The thinner wall section weakened the nozzle to the point that the nozzle could not accommodate the stress generated by the differential expansion between the stainless steel nozzle and the carbon steel barrel.

There is material loss at the burner nozzle tip, "X" vane at the coal pipe elbow and the burner barrel are a result of coal and air flows being higher than design plus stratification of the coal particles in the coal pipe entering the 90° elbow.

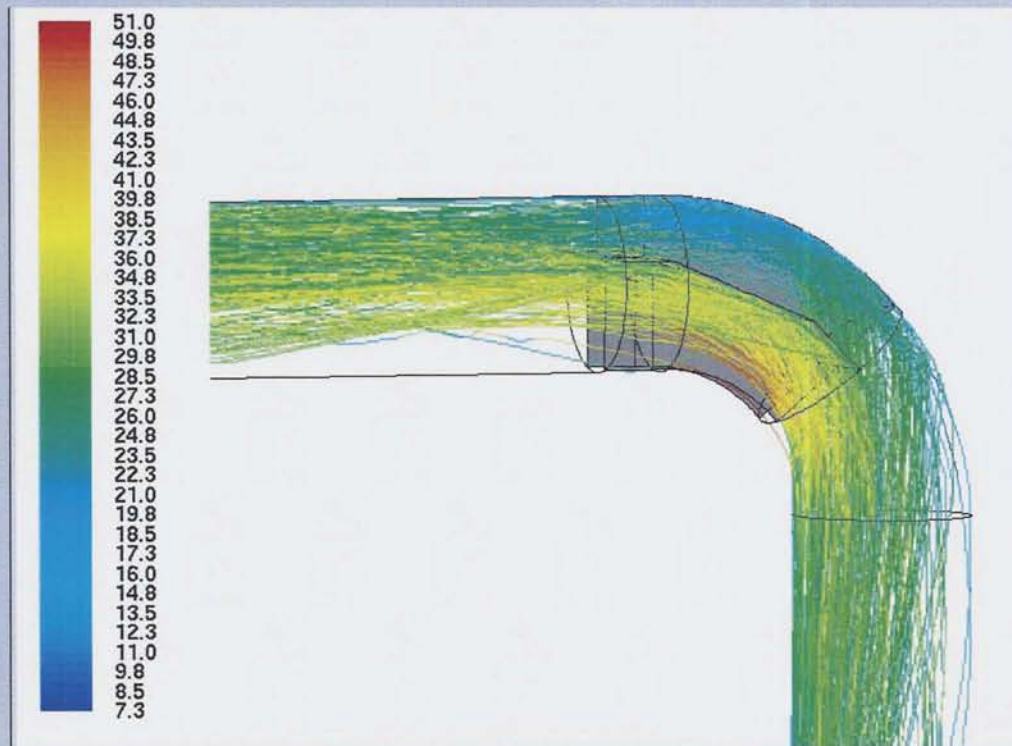
The burner barrel is experiencing permanent deformation due to higher than expected temperatures at the interface between the nozzle and barrel. The burner barrel will use a SS spool piece to extend back into the burner barrel.

Establish the correct primary airflow for normal operation – The plant has not been operating per the B&W mill performance curve supplied in the contract. The mill curve supplied in the contract did not reflect the revision by B&W in 1992. Also, the plant has been operating at higher seal air flows
Definition of requirements for cooling air when the burner is out of service – the Operations and Maintenance manual will have to be revised to address out of service operation

Intermountain Power Service Corp ABT Siemens Warranty Claim

SIEMENS

Erosion and Mill Air Flow



The CFD model shows the coal particles are stratified entering the elbow. The original kicker assembly with the X-vane that was modified to retain the clean out port will not last in the high velocity stream of concentrated coal particles with the higher coal flow.

The revised fuel injector design will increase the cross sectional area of the nozzle to reduce velocities, lengthen and flatten the slope of the transition ramp and replace the round elbow with a "Flat back" design to allow dispersion of the coal particles across the flow area of the nozzle.

Intermountain Power Service Corp ABT Siemens Warranty Claim

SIEMENS

Erosion and Mill Air Flow



Erosion is originating at the transition slope from the round barrel to the 6 lobe exit. This is consistent with the results of the CFD model. The metallurgical analysis performed by Tordonato Energy Consultants identified erosion as a the contributor cause of the nozzle cracking. The high temperatures at the weld between the nozzle and burner barrel increased the stress which also contributed to the cracking. There was no evidence of corrosion.

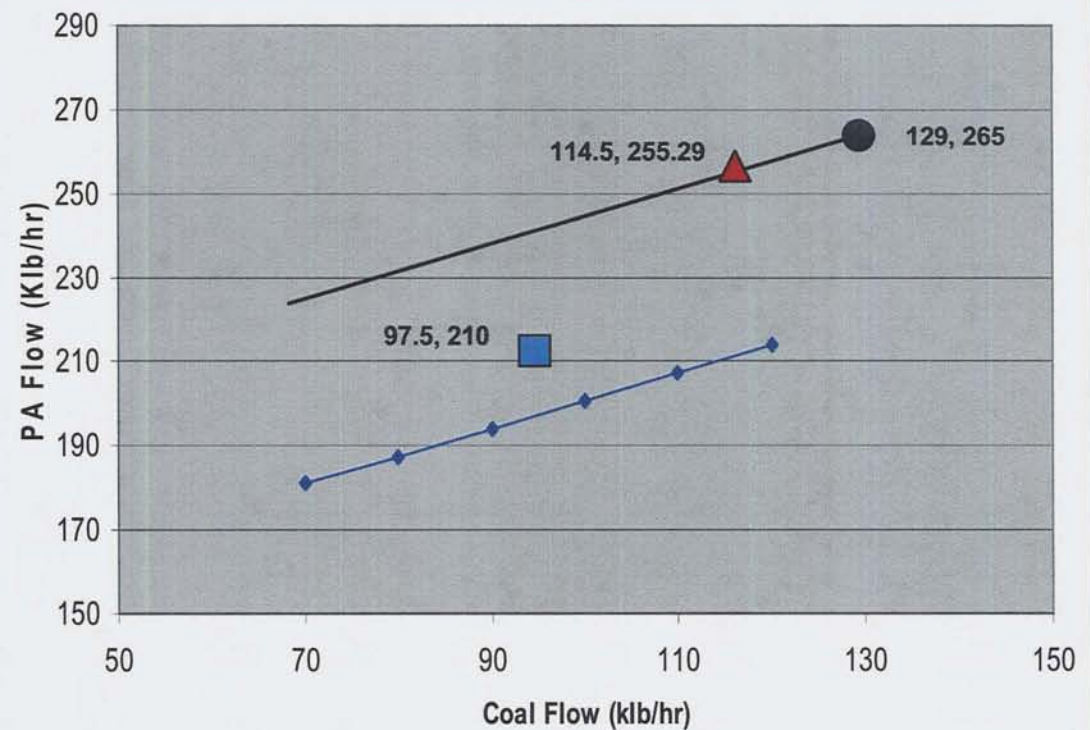
Intermountain Power Service Corp ABT Siemens Warranty Claim

SIEMENS

Erosion and Mill Air Flow



IPSC - Unit 2
MPS-89 G Mill Curve

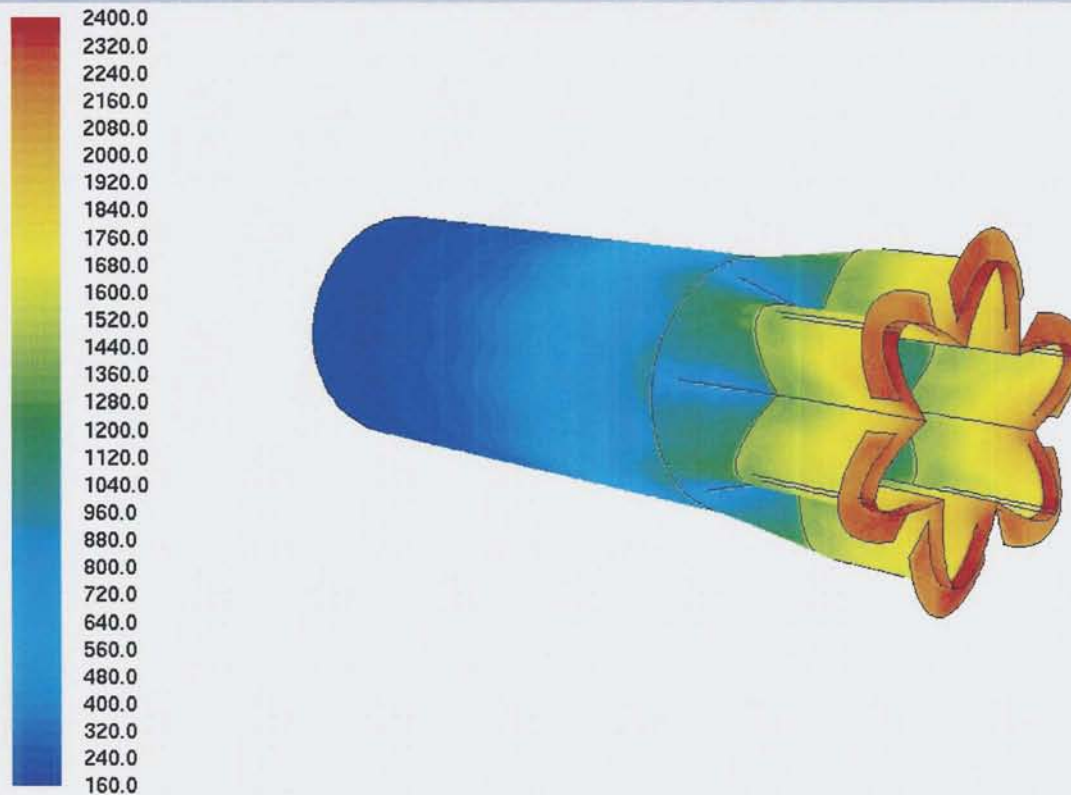


- ◆ B&W Operating Curve
- Original ABT Design Point
- Maximum Mill Load Test Point
- Actual Operating Mill Curve
- ▲ Resized Design Point

Intermountain Power Service Corp ABT Siemens Warranty Claim

SIEMENS

Thermal Stress



Contours of Static Temperature (f)

Sep 26, 2007
FLUENT 6.3 (3d, pbns, pdf20, rke)

The furnace radiation model shows that the heat conducted back to the burner barrel to be higher than expected. The revised fuel injector will use a spool piece of 253MA stainless steel to make the transition from the nozzle to the barrel. The revised fuel injector shall use refractory tile to shield the burner barrel from radiation from the furnace and to minimize erosion. This thermal model does not model the cooling of the secondary air on the tip.

Intermountain Power Service Corp ABT Siemens Warranty Claim

SIEMENS

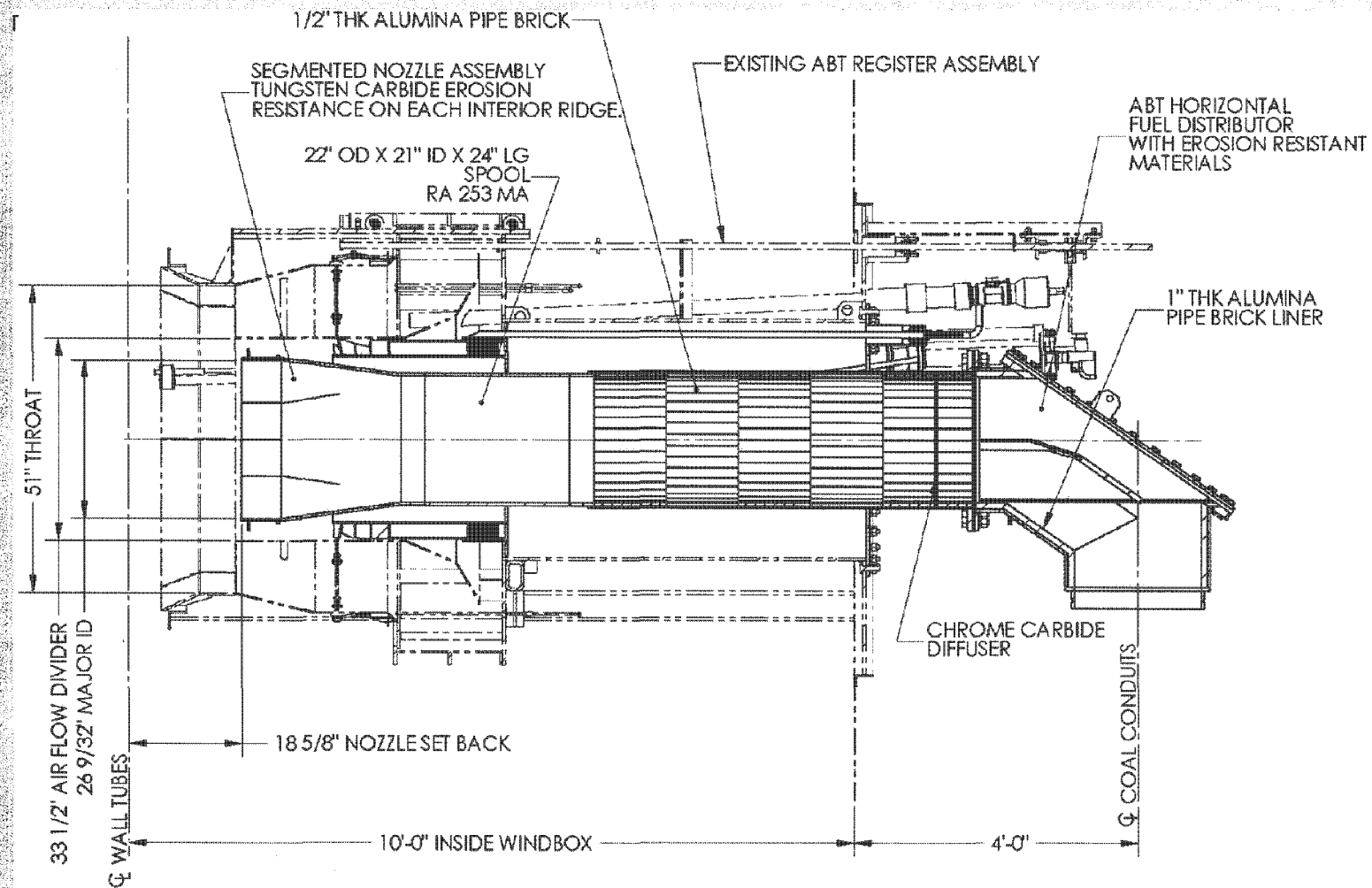
Thermal Stress



The off line burners are plugging with slag indicating that furnace gases are back flowing into the nozzle area. This creates very high temperatures that the nozzles were not designed for. A minimum air flow required to prevent this must maintained.

Intermountain Power Service Corp ABT Siemens Warranty Claim

SIEMENS



**Intermountain Power Service Corp
ABT Siemens Warranty Claim**

SIEMENS

Next Steps

Close Out Six Sigma Program

- Commercial agreement between IPSC and Siemens Power Generation Inc
- Agreement on Division of Responsibilities

It should be noted that destruction of the burners occurred in less than two years since initial installation of the burners.

We feel that several failure mechanisms are occurring and not just one. We feel that they are:

1. Overheating of the tip in an out-of-service condition causing cracking in the tip due to tip design constraints. In the contract it was stated that *"There are no environmental limitations to the coal burners. The reason for stating that there are no environmental limitations to the coal burners is that the stainless steel castings and plate facing the fire, ASTM 297 Gr He or 309 will not deteriorate at temperatures of at least 2,000 F. Consequently, ABT does not consider operation of its design in your boiler to have any environmental limitations. The conditions are such that no material will operate anywhere near its limit. In fact, ABT has placed no such limitation on any retrofit ABT has done.*
Thermocouples were initially installed to monitor the tip and barrel temperatures. Out of service temperatures show that many burner tip temperatures did not even reach the 1600 F limit of the indications even though these burners experienced the same destruction. Cracking near the end of the tip do not appear to be connected to the cracking at the erosion areas.
2. Overheat and permanent deformation of the burner barrel causing excessive stress on the weld between the carbon steel barrel and tip casting. Barrel temperatures during an out-of service condition ranged from 700 to 1000 F. Typically each of the six burners on a row had different upper temperatures.
3. Material loss at the flower tip. The contractual proposal stated that *"The segmented coal nozzle has an open design with no obstructions to wear or to collect coal and all wear is limited to the wear-resistant devices in the elbow."* In less than two years, significant material loss at the flower tip ridges occurred. Cracking from these thinned areas has also occurred. Ductile materials can be very sensitive to abrasion-causing particles depending on the angle of impact. The angle of the tip ridges is around 18 degrees which is high on the erosion vs impact chart.

Money to replace the burner injectors if needed is on the budget. Total replacement of the burners has not been pursued. One option that has been checked into is to replace the flowered ABT tips with straight tips from Power Industrial and make other repairs as needed. The lead time for the parts are 10-12 weeks. Power Industrial supplied Unit 1's nozzles and tips that have lasted over eight years. We have had very good success with their nozzle tip material. A 40" tip out of PI 2000 would be welded in to replace the flowered ABT tip as well as tips replaced last outage. This process was done on 15 burners in Spring 2006 but with nozzle tips removed from old nozzles and older B&W replacement nozzles. The coal nozzles could be modified to accommodate a conical diffuser and coal deflector similar to Unit 1 burner design. NOx would probably increase but we have OFA available on Unit 2.